# Refractories for Pig iron ladle

# The chemical physical properties of the products

The tables hereinafter show the main average properties of the products. These properties, verified by internal testings, are merely indicative and should not be used as guaranteed values for tender technical specifications.

In case of special requirements, technical specifications containing the guaranteed values and those detailing the various properties may be agreed with the Customer during sales negotiations.

The individual properties are determined according to ISO Recommendations and Standards Pre Recommendations (Pre Recommendations - Revision June 1990).

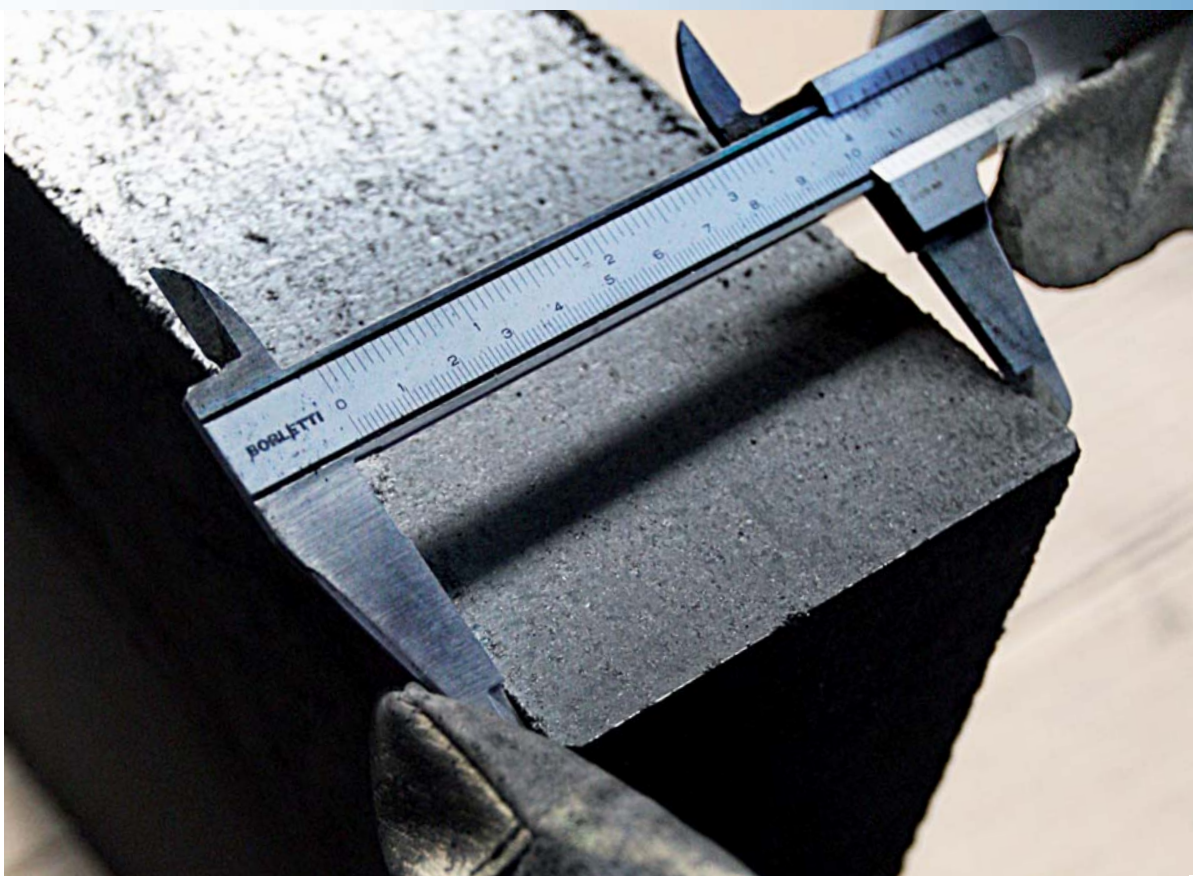
In default of recommendations from the two above Bodies or should special tests be required, special rules or company methods may be adopted. Such rules and methods shall be specified and agreed upon with the Customer.

# Brick dimensions (shapes)

The refractory bricks are produced in the great many shapes required for the correct lining of each plant in which they are to be installed.

SANAC is able to produce both the shapes envisaged by the main international standardization rules and the special shapes for specific uses.

The Design Service is at the Customer's disposal to provide him with the most profitable solutions.



# Dimensional Tolerances

The dimensional tolerances of bricks generally conform with the PRE/R23 Recommendation (“Dimensional tolerances of dense and insulating refractory products”).

Particular tolerances, if any, should be indicated at the time of the en-quiry and be the subject of tender technical specifications.

# Sorting and checkig

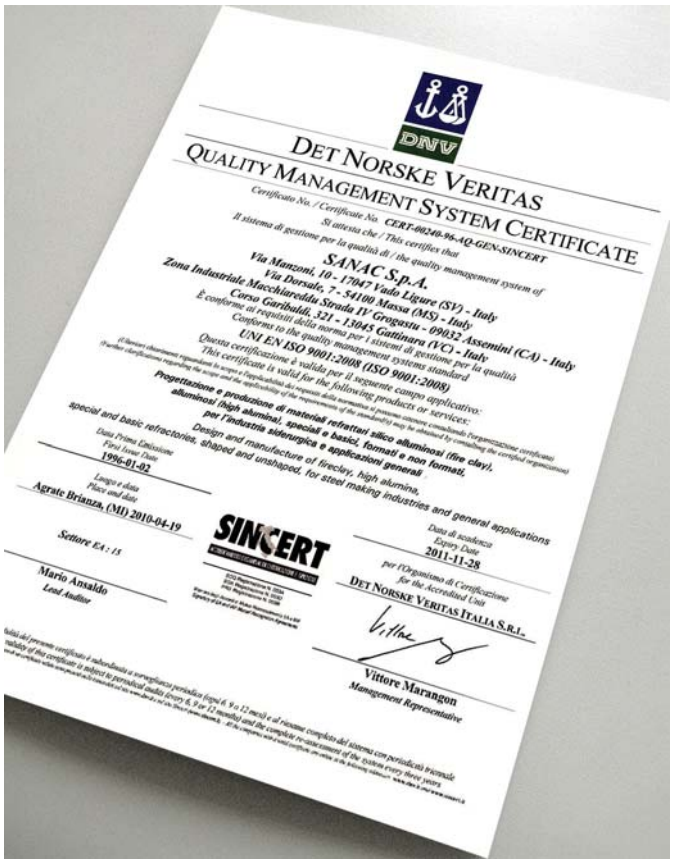
The bricks, removed from the furnaces, after heat treatment, are classified and checked (“Inspection by attributes”) with respect to their dimensional characteristics and their outward appearance (fissures, cracks, chipped edges, stains, etc.).
Furthermore, on a statistical basis, controls are carried out on the chemical-physical properties, such as mainly:

- Chemical analysis
- Refractoriness
- Bulk density
- Porosity
- Cold crushing strength
- Modulus of rupture
- Refractoriness under load (R.U.L.)
- Linear thermal expansion
- Permanent linear change
- Thermal shock
- Permeability to gases.

These tests are made on a routine basis in the Quality Control laboratory of each works.

Special test are carried out by the Central Laboratory of Research.
The production control is effected in accordance with Assurance Quality System.

# Quality




The qualitative standard of a refractory material has reached such a determinant influence level as to condition the operational results.
It is therefore evident the absolute necessity to carry into effect a severe policy of quality in manufacturing.

This policy is imposed by the ever-increasing stresses to which the material is subjected during the operation as well as by the level of high specialization and differentiation reached by refractory products.

In the manufacturing process, therefore all those measures are adopted which are necessary to attain the right quality level and to keep it constant, namely:
- precise processing instructions for each phase of the production process and detailed quality manuals from the raw material control up to the finished products;
- provision of a structure able to produce according to the criteria of the “Quality Assurance”.

All our  works, as well as all our laboratories, are conform to Assurance Quality System in accordance with UNI EN ISO 9001, certified by DNV as shown at side.

# Services

## RESEARCH AND DEVELOPMENT

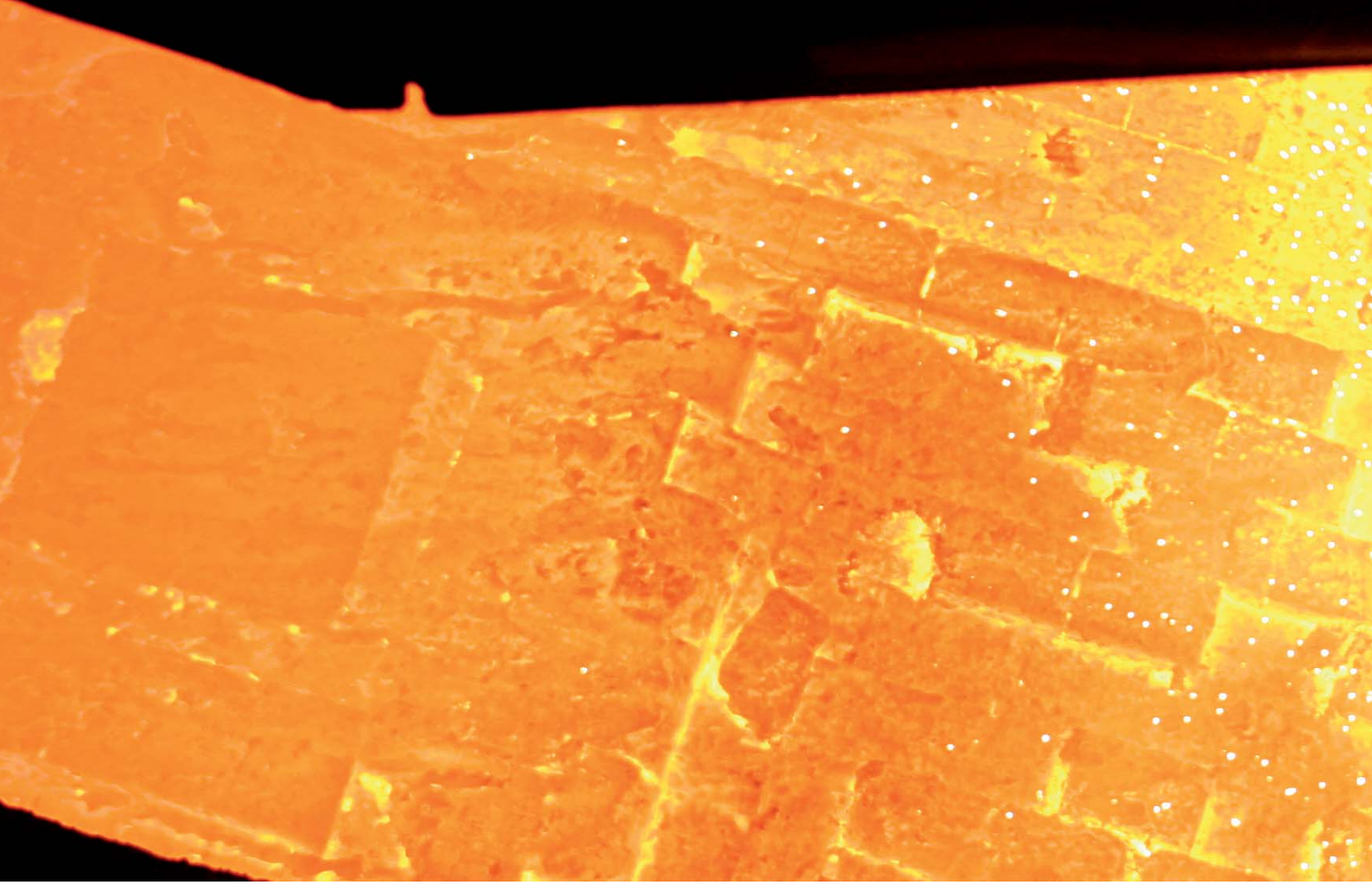
Industrial progress, greatly advances in the latest years, imposes more and more severe conditions to refractory linings and demands materials of more and more sophisticated qualities in order to meet the requirements of better performances under every technical and economical aspect.

In order to take active part in this quick developing process, in addition to the individual Works Laboratories charged with the production control and testing (from raw materials to finished products), SANAC owns a Central Laboratory of Research which employs several highly-qualified specialists.

This unit is fitted with all the most modem equipments necessary to the most advanced technological requirements in the sector, it carries out its activity in applied research, in the production and development of new products, in the improvement of the existing products and relevant manufacturing processes.
The Central Laboratory of Research is in Vado Ligure.

## DESIGN ENGINEERING AND TECHNICAL ASSISTANCE

The Design Engineering and Technical Assistance Service constitutes an integrated system set up in order to cover all stages from design engineering up to construction and installation. Design engineering is carried out with the C.A.D. system.
The Service is in fact a company sector whose function is to find out and solve all problems connected with refractory materials.
It operates on site in dose touch with the user and studies the most valid solutions under the technical and economical aspect, thus reaching a precise detailed design engineering of the individual components of a lining.



# Know-how

SANAC technology is active all over the world. In fact, SANAC puts its own experience at the disposal of other producers of refractory materials.

Many are the know-how agreements stipulated with foreign countries. The collaboration supplied by the Company mainly consists of:

- setting out of the most up-to-date production cycles;
- supervision of plant final design engineering;
- supervision of plant erection and start-up;
- supply of complete know-how;
- training of the Customer's technical personnel in order to hit the production targets.

From Company's profile it is possible to identify the principles which are at the base of its activity and which explain its constant progress in a world-wide refractory industry.

# Pig iron ladle

SANAC, which has always been present in this area, developed a wide range of refractories that can meet all needs related to pig iron transport.

# Sanac's works

1. 13045 GATTINARA (VC)
   Corso Garibaldi, 321
   Phone +39 0163 824711
   Fax +39 0163 89321

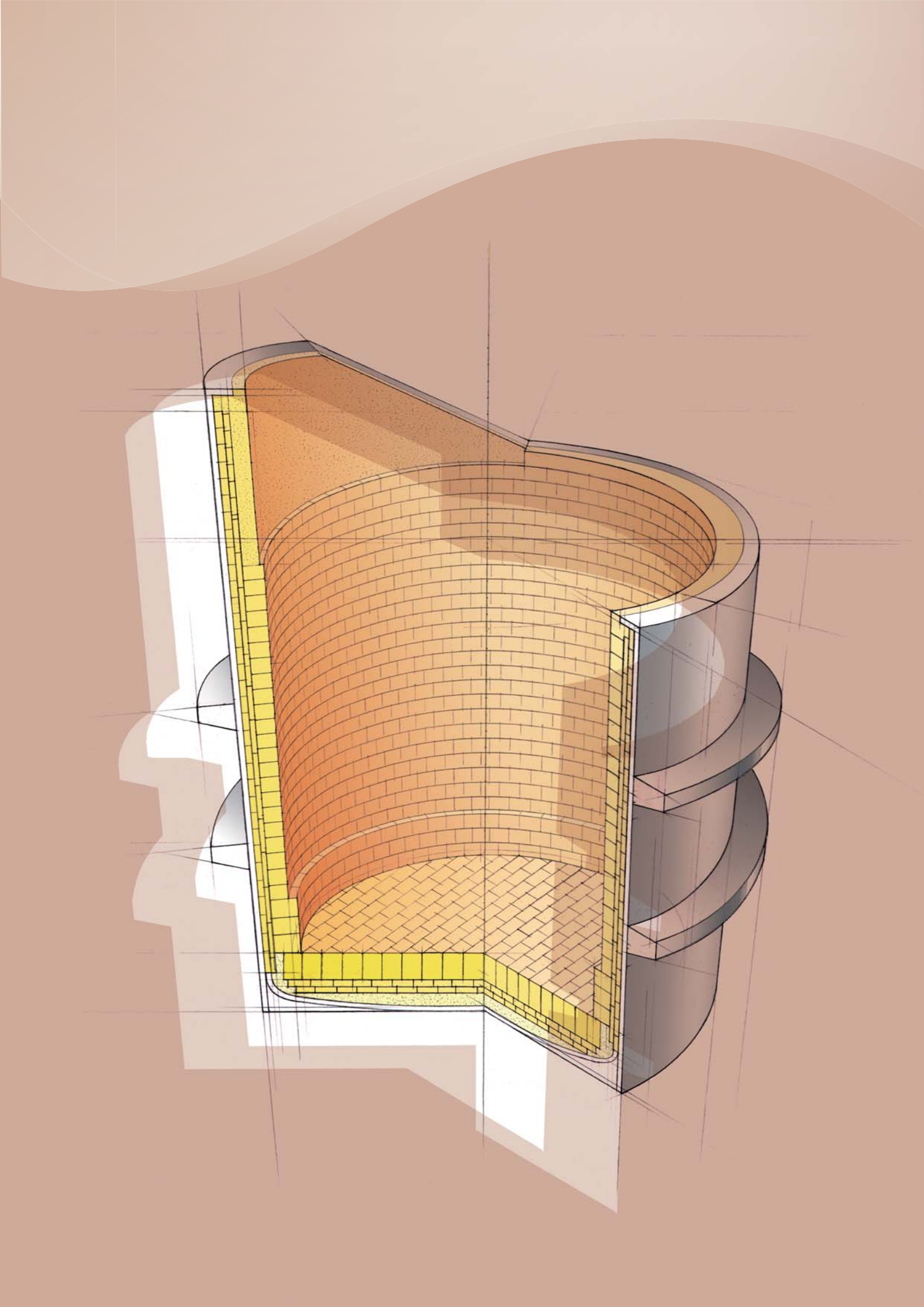
2. 17047 VADO LIGURE (SV)
   Via Manzoni, 10
   Phone +39 019 28951
   Fax +39 019 882555

3. 54100 MASSA
   Via Dorsale, 7
   Zona Industriale
   Phone +39 0585 799001
   Fax +39 0585 799031

4. 09032 ASSEMINI (CA)
   Loc. Grogastu
   Zona Ind. Macchiareddu
   Phone +39 070 24651
   Fax +39 070 247058

# Products

## Refractories for Pig iron ladle



# Safety lining shapes

## SPLIT

| Code | Dimensions (mm) | | | Volume ($dm^3$) |
|---|---|---|---|---|
| | b | h | s | |
| T32 | 111 | 50 | 230 | 1,28 |
| T40 | 111 | 75 | 230 | 1,91 |
| T11 | 115 | 50 | 230 | 1,32 |

## STRAIGHT

| Code | Dimensions (mm) | | | Volume ($dm^3$) |
|---|---|---|---|---|
| | b | h | s | |
| R65 | 115 | 65 | 230 | 1,72 |
| R76 | 115 | 76 | 230 | 2,01 |

## SIDE ARCH

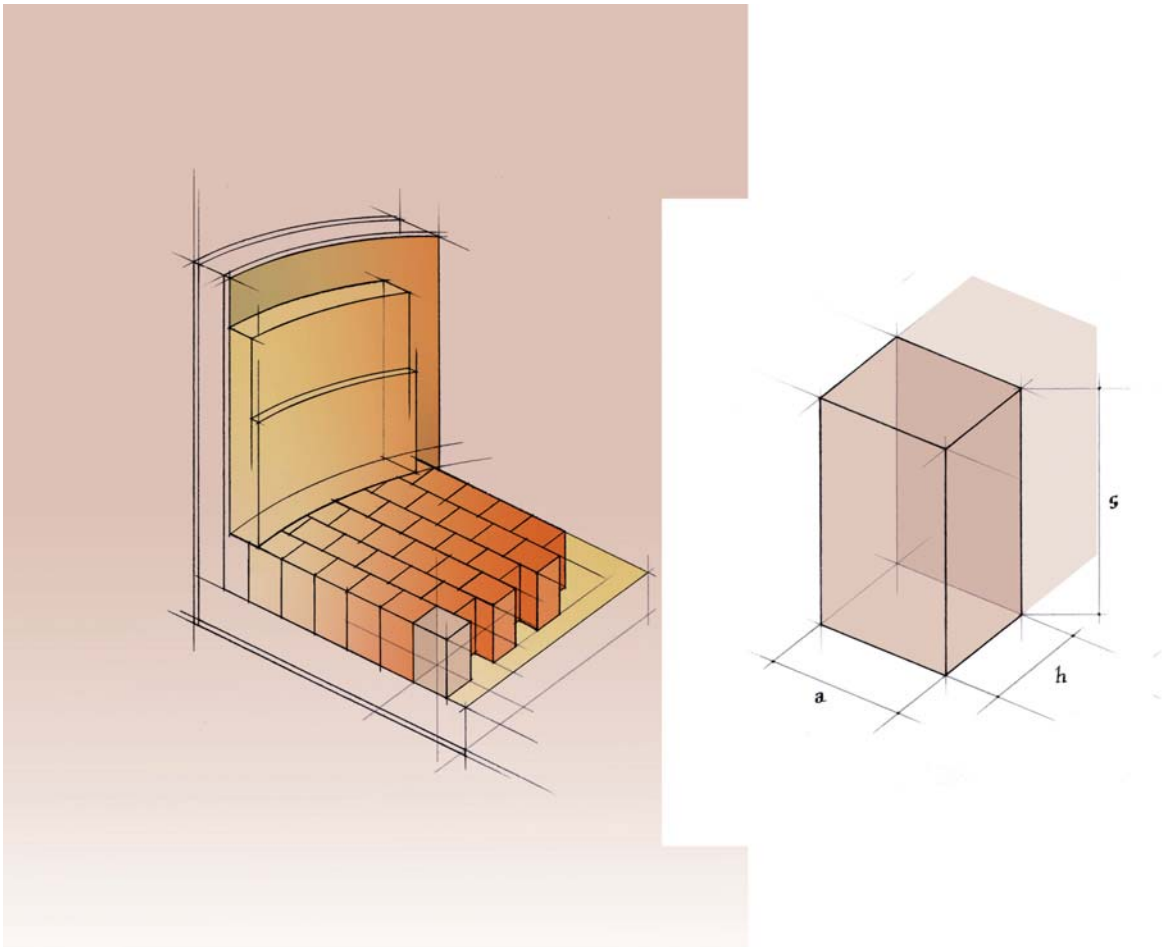
| Code | Dimensions (mm) | | | | Volume ($dm^3$) |
|---|---|---|---|---|---|
| | a | b | h | s | |
| C3 | 115 | 112 | 42 | 230 | 1,10 |
| 11M | 115 | 111 | 50 | 230 | 1,30 |
| 9M | 115 | 111 | 75 | 230 | 1,95 |
| S75 | 108 | 93 | 76 | 230 | 1,76 |
| L76 | 103 | 97 | 76 | 230 | 1,75 |

## RADIAL

| Code | Dimensions (mm) | | | | Volume ($dm^3$) |
|---|---|---|---|---|---|
| | a | b | h | s | |
| S028 | 230 | 220 | 100 | 80 | 1,80 |

# Wear lining shapes

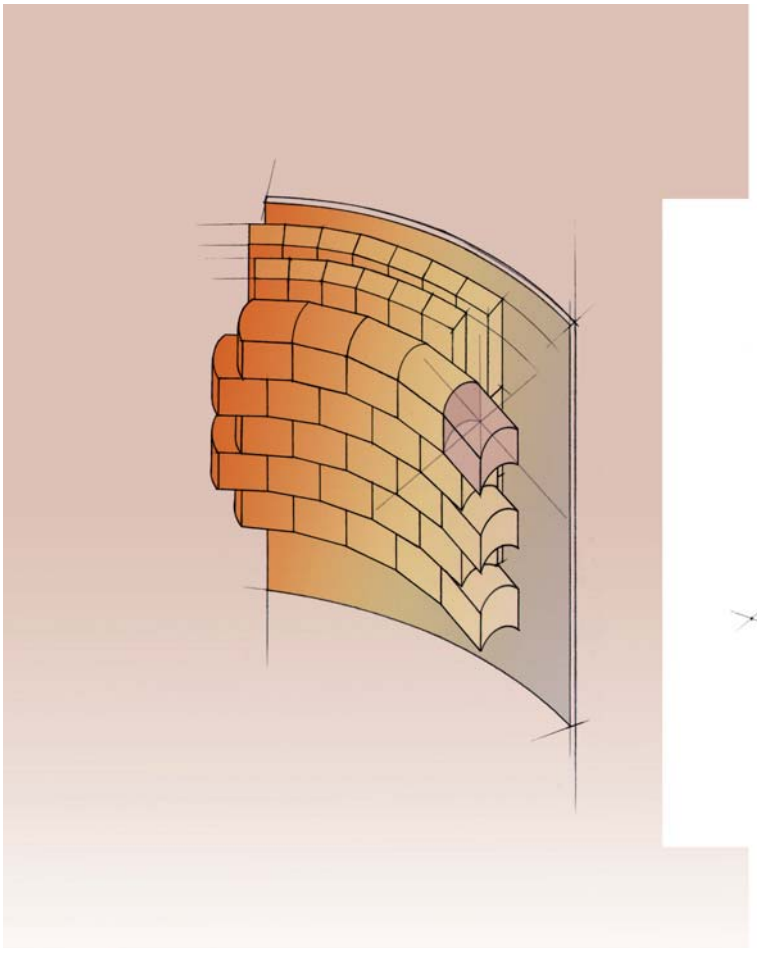
| BOTTOM | | | | |
|---|---|---|---|---|
| **STRAIGHT** | | | | |
| Code | Dimensions (mm) | | | Volume ($dm^3$) |
| | s | h | b | |
| 25/0 | 250 | 150 | 100 | 3,75 |
| 35/0 | 350 | 150 | 100 | 5,25 |
| 2P0 | 250 | 123 | 125 | 3,84 |
| 3P0 | 250 | 155 | 100 | 3,88 |
| 4P0 | 250 | 187 | 100 | 4,68 |
| 5P0 | 250 | 220 | 100 | 5,50 |
| 3K100 | 345 | 172 | 100 | 5,93 |
| K100 | 230 | 172 | 100 | 3,96 |

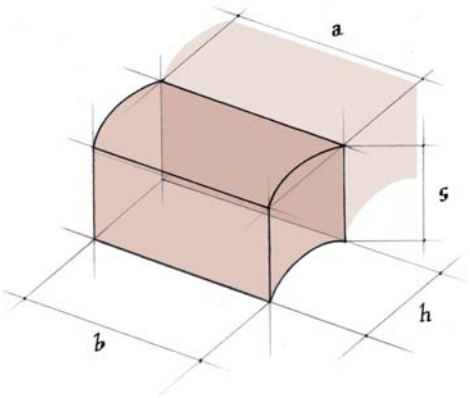


## WALL

## SEMIUNIVERSAL

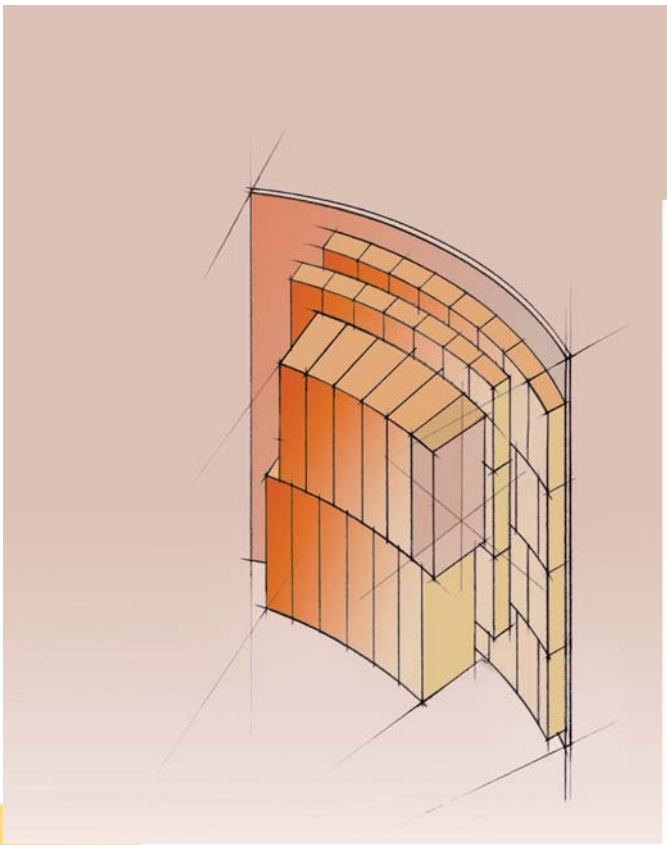
| Code | Dimensions (mm) | | | | Volume ($dm^3$) |
|---|---|---|---|---|---|
| | a | b | h | s | |
| SU460 | 209,5 | 199,4 | 101,6 | 100 | 2,08 |
| SU545 | 209,5 | 192,3 | 127,0 | 100 | 2,55 |
| SU560 | 209,5 | 196,7 | 127,0 | 100 | 2,58 |
| SU645 | 209,5 | 188,7 | 152,4 | 100 | 3,03 |
| SU660 | 209,5 | 194,0 | 152,4 | 100 | 3,07 |
| SU745 | 209,5 | 185,2 | 177,8 | 100 | 3,51 |
| SU760 | 209,5 | 191,4 | 177,8 | 100 | 3,56 |
| SU845 | 209,5 | 181,6 | 203,2 | 100 | 3,97 |
| SU860 | 209,5 | 188,7 | 203,2 | 100 | 4,05 |

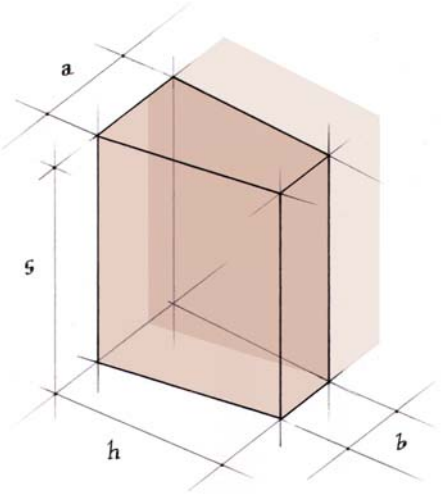




## SIDE ARCH

| Code | Dimensions (mm) | | | | Volume ($dm^3$) |
|---|---|---|---|---|---|
| | a | b | h | s | |
| 2P10 | 130 | 120 | 123 | 250 | 3,84 |
| 2P24 | 137 | 113 | 123 | 250 | 3,84 |
| 3P8 | 103 | 97 | 155 | 250 | 3,88 |
| 3P10 | 105 | 95 | 155 | 250 | 3,88 |
| 3P20 | 110 | 90 | 155 | 250 | 3,88 |
| 4P8 | 104 | 96 | 187 | 250 | 4,68 |
| 4P12 | 106 | 94 | 187 | 250 | 4,68 |
| 4P22 | 111 | 89 | 187 | 250 | 4,68 |
| 5P8 | 104 | 96 | 220 | 250 | 5,50 |
| 5P16 | 108 | 92 | 220 | 250 | 5,50 |
| 5P22 | 111 | 89 | 220 | 250 | 5,50 |





# Safety lining bricks

| PRODUCT | | AF 23 C | AF 26 I | SG 80 DI | AL 50 | M 90 |
|---|---|---|---|---|---|---|
| Main component | | Chamotte | | Alumina Bauxite | Andalusite Bauxite | Alumina Bauxite |
| CHEMICAL ANALYSIS (on raw materials oxides) | | | | | | |
| $Al_2O_3$ | % | 45,5 | 45,0 | 84,0 | 49,0 | 85,2 |
| $SiO_2$ | % | 49,5 | 50,0 | 47,5 | 47,0 | 11,5 |
| $Fe_2O_3$ | % | 1,6 | 1,1 | 1,5 | 0,7 | 1,5 |
| $TiO_2$ | % | 1,7 | 1,7 | 1,5 | 1,1 | 3,5 |
| PHYSICAL PROPERTIES | | | | | | |
| Refractoriness | Seger cone | 34 | 35 | > 37 | 35-36 | > 37 |
| Density | $Kg/dm^3$ | 2,38 | 2,38 | 2,73 | 2,37 | 2,78 |
| Apparent porosity | % | 15 | 13 | 21 | 16 | 18 |
| Cold crushing strength | $Kg/cm^2$ | 600 | > 550 | 1.000 | 600 | 800 |
| Refractoriness under load t 0,5 | °C | 1.425 | 1.470 | 1.480 | 1.450 | 1.500 |
| Reversible expansion at 1.000°C | % | 0,57 | 0,67 | 0,70 | 0,65 | 0,70 |
| Permanent linear change 5 hours | at °C | - | 1.600 | 1.500 | - | 1.600 |
| | % | - | < ± 1,0 | < ± 1,0 | - | - 1,8 |
| Carbon monoxide resistance | | yes | yes | no | yes | no |
| Thermal conductivity at 500°C | W/mK | 1,40 | 1,38 | 2,50 | 1,40 | 2,45 |
| at 1.000°C | W/mK | 1,51 | 1,49 | 2,40 | 1,50 | 2,39 |

# Wear lining bricks

## ALUMINOUS FIRED

| PRODUCT | | SG 60 S | SG 60 SV | LF 62 | LF TS | ESG 59 S |
|---|---|---|---|---|---|---|
| Main component | | Andalusite Bauxite | Andalusite | Andalusite Alumina | | Andalusite |
| CHEMICAL ANALYSIS (on raw materials oxides) | | | | | | |
| $Al_2O_3$ | % | 67,5 | 56,0 | 59,0 | 60,5 | 59,0 |
| $SiO_2$ | % | 29,0 | 42,0 | 38,5 | 37,5 | 38,5 |
| $Fe_2O_3$ | % | 1,4 | 0,8 | 0,9 | 0,9 | 0,9 |
| $TiO_2$ | % | 1,8 | 0,4 | 0,45 | 0,3 | 0,5 |
| PHYSICAL PROPERTIES | | | | | | |
| Refractoriness | Seger cone | > 37 | > 37 | > 37 | > 37 | > 37 |
| Density | $Kg/dm^3$ | 2,59 | 2,55 | 2,56 | 2,59 | 2,58 |
| Apparent porosity | % | 18,0 | 13,0 | 12,5 | 13,5 | 12,5 |
| Cold crushing strength | $Kg/cm^2$ | 750 | 900 | 1.000 | 1.000 | 1.000 |
| Refractoriness under load t 0,5 | °C | 1.530 | 1.570 | 1.600 | 1.600 | 1.600 |
| Linear expansion at 1.000 °C | % | 0,62 | 0,70 | 0,48 | 0,72 | 0,48 |
| Creep at 2 $kg/cm^2$ 50 Hours | at °C | 1.400 | 1.350 | 1.400 | 1.400 | 1.400 |
| | % | < 1 | < 1 | < 1 | < 1 | < 1 |
| Carbon monoxide resistance | | no | no | yes | yes | yes |
| Thermal shock | n° cycles | 15 ÷ 30 | > 20 | > 30 | > 30 | 30 |
| Thermal conductivity at 500 °C | W/mK | 1,4 | 1,4 | 1,4 | 1,4 | 1,4 |
| at 1.000°C | W/mK | 1,5 | 1,5 | 1,5 | 1,5 | 1,5 |

## ALUMINOUS RESIN BONDED

| PRODUCT | | AN 65 RB | AN 60 RB |
|---|---|---|---|
| Main component | | Andalusite Alumina | Andalusite |
| CHEMICAL ANALYSIS (on raw materials oxides) | | | |
| $Al_2O_3$ | % | 63,0 | 63,0 |
| $SiO_2$ | % | 36,0 | 33,0 |
| $Fe_2O_3$ | % | 0,5 | 0,9 |
| $TiO_2$ | % | 0,2 | 0,5 |
| PHYSICAL PROPERTIES | | | |
| Refractoriness | Seger cone | > 37 | > 37 |
| Density | $Kg/dm^3$ | 2,81 | 2,73 |
| Apparent porosity | % | 6,5 | 7,0 |
| Cold crushing strength | $Kg/cm^2$ | 600 | 600 |
| Linear expansion at 1.000 °C | % | - | - |
| Characteristics | | Thermal shock resistance | |

## SPINEL

| PRODUCT | | KCA 305 | KCR 305 | CA | | | |
|---|---|---|---|---|---|---|---|
| | | | | 056 | 300 | 307 | 095 |
| Main component | | Corundum Magnesite | | Bauxite Magnesite | | | |
| CHEMICAL ANALYSIS (on raw materials oxides) | | | | | | | |
| $Al_2O_3$ | % | 61,0 | 58,0 | 84,5 | 61,5 | 59,0 | 80,8 |
| $SiO_2$ | % | 0,7 | 3,2 | 5,8 | 4,0 | 4,0 | 4,7 |
| $Fe_2O_3$ | % | 0,3 | 0,6 | 1,1 | 0,8 | 0,8 | 0,9 |
| $TiO_2$ | % | 1,9 | 0,7 | 2,8 | 2,1 | 1,8 | 2,3 |
| MgO | % | 35 | 35 | 5,5 | 30,5 | 32,0 | 9,6 |
| C | | + 6,3 | + 6,5 | + 6,8 | + 1,2 | + 8,7 | + 6 |
| Metallic additives | | yes | yes | yes | yes | yes | no |
| PHYSICAL PROPERTIES | | | | | | | |
| Refractoriness | Seger cone | > 37 | > 37 | > 37 | > 37 | > 37 | > 37 |
| Density | $Kg/dm^3$ | 3,09 | 2,96 | 2,90 | 2,95 | 2,82 | 2,85 |
| Apparent porosity | % | 8,0 | 12,0 | 8,0 | 9,0 | 7,0 | 7,0 |
| Cold crushing strength | $Kg/cm^2$ | > 350 | > 400 | > 350 | >350 | > 350 | > 350 |
| Thermal expansion at 1.000° C | °C | 0,83 | 0,80 | 0,77 | 0,90 | 0,82 | 0,80 |
| Thermal conductivity at 500°C | W/mK | 4,3 | 4,1 | 3,8 | 2,0 | 4,4 | 3,2 |
| at 1.000°C | W/mK | 3,5 | 3,5 | 3,0 | 1,3 | 3,6 | 2,7 |

## CHEMICALLY BONDED

| PRODUCT | | LCB | |
|---|---|---|---|
| | | 80 | 86 |
| Main component | | Bauxite | |
| CHEMICAL ANALYSIS (on raw materials oxides) | | | |
| $Al_2O_3$ | % | 80,0 | 83,0 |
| $SiO_2$ | % | 12,5 | 9,5 |
| $Fe_2O_3$ | % | 1,5 | 1,3 |
| $TiO_2$ | % | 3,0 | 3,2 |
| PHYSICAL PROPERTIES (after heating at 1.250 °C) | | | |
| Refractoriness | Seger cone | > 37 | > 37 |
| Density | $Kg/dm^3$ | 2,86 | 2,88 |
| Apparent porosity | % | 19,0 | 15,5 |
| Cold crushing strenght | $Kg/cm^2$ | > 800 | > 600 |
| Characteristics | | Thermal shock resistance | |

# Cements

| PRODUCT | | | Chemically bonded ready | | Chemically bonded dry | Hydraulic bonded dry | Heat setting dry | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | BONDLOK | | SINTBOND 80 | ALSIBOND | CEM | | |
| | | | KB | Z | | | 72 | 90 | z G |
| Main component | | | Corundum | | Bauxite | Corundum | Mullite | Bauxite | |
| | | | | Chrome oxide | Corundum | | | | |
| CHEMICAL ANALYSIS (on raw materials oxides) | | | | | | | | | |
| $Al_2O_3$ | % | PRE R24 | 79,5 | 78,5 | 70,5 | 97,0 | 73,0 | 77,5 | 73,0 |
| $SiO_2$ | % | PRE R24 | 15,5 | 11,5 | 20,0 | 0,45 | 26 | 17,0 | 21,0 |
| $P_2O_5$ | % | PRE R24 | 3,2 | 3,2 | 1,4 | - | - | - | - |
| $Cr_2O_3$ | % | PRE R24 | - | 5 | - | - | - | - | - |
| Alkali | % | PRE R24 | - | - | 1,4 | - | - | - | - |
| PHYSICAL PROPERTIES | | | | | | | | | |
| Grain size max. | mm | PRE R25 | 0,2 | 0,2 | 0,5 | 0,2 | 0,2 | 0,5 | 1,0 |
| Fraction < 0,063 mm min. | % | UN12231/ 2232 | 65 | 65 | 65 | 65 | 65 | 60 | 60 |
| Refractoriness | Seger cone | ISR528 | > 37 | > 37 | 37 | > 37 | > 37 | > 37 | 37 |
| Bonding strenght after heating 24 h at 450'C | $Kg/cm^2$ | (") | 80 | 40 | 30 | 30 | (110 °C) 30 | (110 °C) 15 | (110 °C) 18 |
| 5 h at 1.000'C | $Kg/cm^2$ | - | 90 | 100 | 10 | 20 | - | - | - |
| 5 h at 1.400'C | $Kg/cm^2$ | - | 200 | 220 | 60 | 340 | - | - | - |
| Water required | % | (") | - | - | 16 | 20 | 23 | 30 | 31 |
| Retentive time | min. | (") | > 1 | > 2 | 1,5 | 1 | > 21 | > 2 | > 2 |
| Characteristics | - | - | Heat setting | | Air setting | | Heat setting | | |

# Regular castables

| PRODUCT | | | ALOCAST | | | | |
|---|---|---|---|---|---|---|---|
| | | | F 44 LI | CH 55 | CH 66 | CH 98 | CH 98 S |
| Main component | | | Fireclay | | Bauxite Andalusite | | Tabular alumina |
| CHEMICAL ANALYSIS (on raw materials oxides) | | | | | | | |
| $Al_2O_3$ | % | PRE R24 | 51,0 | 55,0 | 72,0 | 91,0 | 94,5 |
| $SiO_2$ | | PRE R24 | 38,5 | 39,0 | 20,0 | 3,0 | 0,5 |
| $Fe_2O_3$ | | PRE R24 | 1,7 | 0,8 | 0,8 | 0,5 | 0,1 |
| CaO | | PRE R24 | 7,5 | 4,0 | 4.0 | 4,5 | 4,5 |
| PHYSICAL PROPERTIES | | | | | | | |
| Max service temperature | °C | (**) | 1.500 | 1.600 | 1.600 | 1.800 | 1.800 |
| Quantity required | $t/m^3$ | (**) | 2,17 | 2,29 | 2,47 | 2,56 | 2,72 |
| Water required | % | PRE R26 | 12 | 10 | 11 | 11 | 10 |
| PERMANENT LINEAR CHANGE AFTER HEATING | | | | | | | |
| 5 h at 1.000 °C | % | PRE R28 | - 0,3 | - 0,2 | - 0,2 | 0,0 | 0,0 |
| 5 h at max service temperature | | PRE R28 | 1,5 | 2,0 | - 0,8 | - 0,8 | - 0,5 |
| BULK DENSITY AFTER HEATING | | | | | | | |
| 24 h a 110 °C | $gr/cm^3$ | PRE R9 | 2,24 | 2,36 | 2,55 | 2,64 | 2,78 |
| 5 h at 1.000 °C | | PRE R9 | 2,09 | 2,34 | 2,50 | 2,59 | 2,73 |
| 5 h at max service temperature | | PRE R9 | 1,89 | 2,09 | 2,75 | 2,75 | 2,76 |
| COLD CRUSHING STRENGTH AFTER HEATING | | | | | | | |
| 24 h a 110 °C | $Kg/cm^2$ | PRE R28 | 850 | 570 | 420 | 580 | 600 |
| 5 h a 1.000 °C | | PRE R28 | 400 | 350 | 350 | 500 | 500 |
| 5 h at max service temperature | | PRE R28 | 300 | 450 | 850 | 850 | 900 |
| MODULUS OF RUPTURE AFTER HEATING | | | | | | | |
| 24 h at 110 °C | $Kg/cm^2$ | PRE R28 | 60 | 75 | 60 | 85 | 90 |
| 5 h at 1.000 °C | | PRE R28 | 20 | 30 | 20 | 60 | 70 |
| 5 h at max service temperature | | PRE R28 | 60 | 100 | 75 | 120 | 130 |
| THERMAL CONDUCTIVITY | | | | | | | |
| at 500 °C | W/mK | PRE R32 | 0,71 | 1,00 | 1,30 | 1,30 | 1,20 |
| at 1.000 °C | | PRE R32 | 0,78 | 1,10 | 1,40 | 1,40 | 1,50 |
| Characteristics | | | - | (*) | | - | - |
| APPLICATION METHOD | | | | | | | |
| | | | - | | | | |

(*) Available with steel needles added

(**) Internal method

| PRODUCT | | | ALOCAST | | | | |
|---|---|---|---|---|---|---|---|
| | | | LX 48 | LX 58 | LX 68 | LX 85 | HTC 85 |
| Main component | | | Chamotte Mullite | Andalusite | Andalusite Corundum | Bauxite | |
| CHEMICAL ANALYSIS (on raw materials oxides) | | | | | | | |
| $Al_2O_3$ | % | PRE R24 | 51,5 | 59,0 | 79,0 | 82,0 | 84,5 |
| $SiO_2$ | | PRE R24 | 44,0 | 37,0 | 15,5 | 11,0 | 10,5 |
| $Fe_2O_3$ | | PRE R24 | 0,8 | 0,6 | 0,4 | 1,0 | 0,8 |
| CaO | | PRE R24 | 1,4 | 2,4 | 2,3 | 2,4 | 1,0 |
| PHYSICAL PROPERTIES | | | | | | | |
| Max service temperature | °C | (*) | 1.500 | 1.600 | 1.600 | 1.600 | 1.700 |
| Quantity required | $t/m^3$ | (*) | 2,45 | 2,65 | 2,89 | 2,85 | 2,89 |
| Water required | % | PRE R26 | 5,0 - 6,0 | 4,5 – 5,5 | 4,3 – 4,8 | 5,0 | 5,0 |
| PERMANENT LINEAR CHANGE AFTER HEATING | | | | | | | |
| 5 h at 1.000 °C | % | PRE R28 | - 0,20 | 0,04 | - 0,15 | - 0,20 | - 0,20 |
| 5 h at max service temperature | % | PRE R28 | 0,2 | 0,6 | + 1,4 | 1,6 | 0,7 |
| BULK DENSITY AFTER HEATING | | | | | | | |
| 24 h at 110 °C | $gr/cm^3$ | PRE R9 | 2,48 | 2,69 | 2,93 | 2,89 | 2,93 |
| 5 h at 1.000 °C | | PRE R9 | 2,46 | 2,66 | 2,90 | 2,86 | 2,90 |
| 5 h at max service temperature | | PRE R9 | 2,45 | 2,61 | 2,77 | 2,80 | 2,83 |
| COLD CRUSHING STRENGTH AFTER HEATING | | | | | | | |
| 24 h at 110 °C | $kg/cm^2$ | PRE R28 | 1.000 | 1.300 | 1.400 | 1.300 | 950 |
| 5 h at 1.000 °C | | PRE R28 | 1.000 | 900 | 1.400 | 1.200 | 1.500 |
| 5 h at max service temperature | | PRE R28 | 1.330 | 1.300 | 800 | 900 | 1.300 |
| MODULUS OF RUPTURE AFTER HEATING | | | | | | | |
| 24 h at 110 °C | $Kg/cm^2$ | PRE R28 | 120 | 170 | 200 | 190 | 130 |
| 5 h at 1.000 °C | | PRE R28 | 170 | 70 | 140 | 170 | 230 |
| 5 h at max service temperature | | PRE R28 | 120 | 100 | 100 | 140 | 110 |
| THERMAL CONDUCTIVITY | | | | | | | |
| at 500 °C | W/mK | PRE R32 | 1,54 | 1,70 | 2,07 | 2,40 | 2,00 |
| at 1.000 °C | | PRE R32 | 1,48 | 1,80 | 1,87 | 2,20 | 2,10 |
| Characteristics | | | With metallic needles added | | | | |
| APPLICATION METHOD | | | | | | | |
| | | | Vibrating | | | | |

(*) Internal method

# Special Products

| PRODUCT | | | ALOFLOW | ALOGUN |
|---|---|---|---|---|
| | | | LX 48 | BF 525 |
| Main component | | | Mullitic chamotte | |
| | | | CHEMICAL ANALYSIS (on raw materials oxides) | |
| $Al_2O_3$ | % | PRE R24 | 53,0 | 52,5 |
| $SiO_2$ | | PRE R24 | 43,0 | 38,0 |
| $Fe_2O_3$ | | PRE R24 | 0,7 | 0,6 |
| CaO | | PRE R24 | 1,5 | 6,5 |
| | | | PHYSICAL PROPERTIES | |
| Grain size max | mm | - | 6 | 6 |
| Max service temperature | °C | (*) | 1.500 | 1.500 |
| Quantity required | $t/m^3$ | (*) | 2,40 | 2,06 |
| Water required | % | - | 7,0 ÷ 7,5 | 13,0 ÷ 15,0 |
| | | | PERMANENT LINEAR CHANGE AFTER HEATING | |
| 24 h at 110 °C | % | PRE R28 | - | - |
| 5 h at 1.000 °C | | PRE R28 | + 0,2 | - 0,2 |
| 5 h at max service temperature | | PRE R28 | - 0,2 | + 0,4 |
| | | | BULK DENSITY AFTER HEATING | |
| 24 h at 110 °C | $gr/cm^3$ | PRE R9 | 2,45 | 2,09 |
| 5 h at 1.000 °C | | PRE R9 | 2,22 | - |
| 5 h at max service temperature | | PRE R9 | 2,41 | - |
| | | | COLD CRUSHING STRENGTH AFTER HEATING | |
| 24 h at 110 °C | $kg/cm^2$ | PRE R28 | 1.250 | 850 |
| 5 h at 1.000 °C | | PRE R28 | 1.000 | 450 |
| 5 h at max service temperature | | PRE R28 | 1.350 | 650 |
| | | | MODULUS OF RUPTURE AFTER HEATING | |
| 24 h at 110 °C | $Kg/cm^2$ | PRE R28 | 120 | 65 |
| 5 h at 1.000 °C | | PRE R28 | 165 | 30 |
| 5 h at max service temperature | | PRE R28 | 145 | 90 |
| | | | THERMAL CONDUCTIVITY | |
| at 500 °C | W/mK | PRE R32 | 1,51 | 0,90 |
| at 1.000 °C | | PRE R32 | 1,40 | 0,92 |
| | | | APPLICATION METHOD | |
| | | | Self-flowing | Gunning |

(*) Internal method

SANAC

www.sanac.com

Commercial Direction and Central Laboratory
17047 VADO LIGURE (SV) - Via Manzoni 10
phone +39 019 28951
fax +39 019 2160156/2161399

ILVA

www.ilvaspa.com